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Preface by Milton D. Miller

Interviews conducted by
Roy Bainer

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PREFACE

I am honored and pleased to have been invited to write a preface to James Partridge Fairbank's "Oral History". We have been warm friends and close working colleagues for many years. For over fifty years James Partridge

Statement of Editorial Purpose

The procedures of our oral history projects include not only the tape recording of memoirs but also their transcription, editing, and eventual production in book form. What is presented to the reader is a version of the spoken word, and overt attempts to mask this fact rob the presentation of the intimacy, candor and spontaneity which give each memoir freshness and charm. However, standard and recognized editorial techniques are used to maintain a consistency of style throughout all oral history project publications. Since basically each title is for University archival deposit, such matters as dates, names, places, and scientific terminology must be presented with the utmost precision. Editors will rely on the Chicago Manual of Style (1969) and the project's own style sheet to maintain an optimal printed version of the spoken word.

If you would take an airplane trip the length of the state, you would soon see many important concepts in which Jim Fairbank has played a major development role. You could see such things as his pickup and loading equipment at work--saving back-breaking human labor, and making for more economical production; mechanical pickers at work in huge fields of cotton; a rural fire department putting out a grain harvester fire before it caused extensive damage; fruits and nuts being mechanically harvested; equipment at work in Extension Service test fields accurately measuring the treatments and results; specialists and farm advisors (whom Jim had a hand in selecting and developing) holding meetings in the field or visiting farms to trouble shoot problems, thus encouraging the progress of agriculture. As you read Jim's story which follows you will learn in detail of his far-ranging activities.

Jim is well remembered for his easy wit. He always had a word or two to relieve a tense situation. Since he often made himself the subject of his humor, some comment and quick reply about his frail stature could always be expected: "Jim, the north wind is blowing hard--you hadn't better try to walk across the Quad." "No problem. I'm carrying a rock in my pocket for ballast." Or about his ageless appearance: "Jim it's been five years since I've seen you, but you haven't changed!" And Jim came back: "Have you ever been to Chicago's Field Museum and looked at the mummies? They don't change much either!"

PREFACE

I am honored and pleased to have been invited to write a preface to James Partridge Fairbank's "Oral History". We have been warm friends and close working colleagues for many years. For over fifty years James Partridge Fairbank has provided technical engineering answers and sage personal counsel to generations of Extension workers and members of the agricultural engineering profession--and thereby to the California farm people they serve. Even in many "Golden Years" of retirement this continued. In 1937, as a young farm advisor in Ventura County, I asked Extension Agricultural Engineer Jim Fairbank to help me locate a precision fertilizer drill to use in field and vegetable crops tests. None existed. But in less than six weeks, he showed up in the county with a rig he had created in the shops at UC Davis. Not only did Jim's horse-drawn fertilizer drill work well the first time in the field, but it turned out to be the prototype of the now widely valued, tractor-mounted, Fairbank fertilizer applicator units, used by agricultural research workers.

As extension agronomist for the University of California for nearly thirty years, my work naturally dove-tailed into many of the field crops projects on which Jim worked, including cotton mechanization, field seed harvesting and processing--and statewide 4-H Club projects such as the annual 4-H Club Convention held on the UC Davis campus. Out of these many years of close professional activities came a very keen appreciation of Jim, his family and his tremendous contributions to agriculture and its people.

If you would take an airplane trip the length of the state, you would soon see many important concepts in which Jim Fairbank has played a major development role. You could see such things as hay pickup and loading equipment at work--saving back-breaking human labor, and making for more economical production; mechanical pickers at work in huge fields of cotton; a rural fire department putting out a grain harvester fire before it caused extensive damage; fruits and nuts being mechanically harvested; equipment at work in Extension Service test fields accurately measuring the treatments and results; specialists and farm advisors (whom Jim had a hand in selecting and developing) holding meetings in the field or visiting farms to trouble shoot problems, thus encouraging the progress of agriculture. As you read Jim's story which follows you will learn in detail of his far-ranging activities.

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After recently spending a winter day with Jim, I sat before my fireplace in the evening reflecting on the day's activities. Yes, Jim Fairbank's concern for the individual and his help to all California agriculture have truly become living threads in strengthening the fabric of rural California and its people. He provided important reinforcement to the foundations of today's food and fiber production potential--and added the satisfaction that comes from living on and tilling the soil.

An inscription engraved in marble in the foyer of the National Art Gallery in Washington, D.C., in my opinion, describes Jim's philosophy--and his many contributions in serving the people.

"For the whole earth is the sepulchre of famous men
and their story is not graven only on stone over their
native earth, but lives on far away without visible
symbol woven into the stuff of other men's lives."

To Jim:

With respect, admiration, and affection.

Milton D. Miller
Extension Agronomist, Emeritus

May 3, 1978

BAINER: We are in my office, 3030 Engineering Building, May 23, Monday, 1977, and I have with me James P. Fairbank. We are starting to tape an oral history covering Jim's long service as an Extension

HISTORY OF THE INTERVIEW of California. Jim, where were you born?

FAIRBANK: I was born in 1901, Nebraska.

BAINER: Many Cooperative Extension specialists occupy an unusual place in the hearts and the minds of the farm families they serve as well as in the thoughts of their colleagues in the department on campus to which they are attached. Included in this group is James P. Fairbank whose contributions to agriculture are delineated in the Preface written by Milton D. Miller, who makes it clear why Fairbank is considered such a rare and special person.

FAIRBANK: ... afterwards we moved to a farm in Adams County, Nebraska. That's in the southeast

BAINER: Securing the memoir had been suggested to the Oral History Office by many of Fairbank's friends and admirers but the project required an interviewer who knew Jim's life and works so well that he could act as a memory jogger when needed.

FAIRBANK: Such an interviewer is Dean Emeritus Roy Bainer who had been chairman of the Department of Agricultural Engineering in which Fairbank is closely identified. Bainer's informed questions bring out the answers that form the substance of this short but notable memoir.

FAIRBANK: Well, I am not quite sure, Roy, the status of that purchase; however, it was a quarter section. A. I. Dickman I think he paid the sum of \$1.50 an acre. Head, Oral History Office

BAINER: Oh, boy! What a bargain.

FAIRBANK: For that quarter section of land. And it was really good land and the crops he grew in that country were corn and of course hay and hogs went along with corn -- all good corn. He followed the common methods of agricultural production at that time in that area.

BAINER: Tell us something about your mother, Jim.

FAIRBANK: My mother was Grace Partridge and she was raised in the state of Michigan. It was back in the middle east or middle west I guess we better call it, that my father and mother met and married.

BAINER: How many children were in your family?

FAIRBANK: There were seven children but two died when they were very young.

BAINER: So you were raised pretty much alone then?

FAIRBANK: I was pretty much alone on that farm in southeastern Nebraska.

BAINER: We are in my office, 3030 Engineering Building, May 23, Monday, 1977, and I have with me James P. Fairbank. We are starting to tape an oral history covering Jim's long service as an Extension Engineer, University of California. Jim, where were you born?

FAIRBANK: I was born in Ord, Nebraska.

BAINER: When?

FAIRBANK: 1891.

BAINER: Did you live on a farm?

FAIRBANK: No, not when I was born. A couple of years afterwards we moved to a farm in Gage County, Nebraska -- that's in the southeast corner of the state.

BAINER: What business was your father in? I mean, tell us a little bit about your father and mother.

FAIRBANK: Well, my father was the Postmaster. Later, he bought a farm from the United States Government near Diller, Nebraska.

BAINER: You say he bought a farm from the United States Government? Was this a claim?

FAIRBANK: Well, I am not quite sure, Roy, the status of that purchase; however, it was a quarter section of good land. I think he paid the sum of \$1.50 an acre.

BAINER: Oh, boy! What a bargain.

FAIRBANK: For that quarter section of land. And it was really good land and the crops he grew in that country were corn and of course hay and hogs went along with corn -- all good corn. He followed the common methods of agricultural production at that time in that area.

BAINER: Tell us something about your mother, Jim.

FAIRBANK: My mother was Grace Partridge and she was raised in the state of Michigan. It was back in the middle east or middle west I guess we better call it, that my father and mother met and married.

BAINER: How many children were in your family?

FAIRBANK: There were three children but two died when they were very young.

BAINER: So you were raised pretty much alone then?

FAIRBANK: I was pretty much alone on that farm in southeastern Nebraska.

BAINER: Then you attended public schools, high school, in this town?

FAIRBANK: Yes, I attended the rural public school, Valley School it was named, through the 8th grade.

BAINER: Is this one of the schools where all the grades were in one room?

FAIRBANK: All the grades in one room and after graduation from the grade school I attended high school in Diller, Nebraska which was about a mile and a half from the farm. I either walked or rode a pony or bicycle while I was attending high school. I went through the ninth to twelfth grade.

BAINER: What influenced you to go to the university?

FAIRBANK: University? I went to the University of Nebraska -- what influenced me? Well, I think it was considered to be the thing to do to go to college and I could.

BAINER: Did quite a few from your area go?

FAIRBANK: Not many. I don't know how many went to the University of Nebraska from there.

BAINER: Did you start right in with the program of Agricultural Engineering? How come you selected Ag Engineering?

FAIRBANK: Well, yes, I did. I visited the University of Nebraska at Lincoln and met the Head of the Department of Agricultural Engineering and I was influenced by him and the situation there so that I thought I would like to take Agricultural Engineering when I went to the University.

BAINER: That was Professor Chase?

FAIRBANK: L.W. Chase.

BAINER: L.W. Chase. I remember him.

FAIRBANK: You do?

BAINER: Yes. I just met him once or twice. I went to my first ASAE meeting at St. Paul in 1927 and he was there. Were there any of your relatives that had any influence on you -- I mean were you close to any of your relatives other than father or mother?

FAIRBANK: Well, not really. No relatives lived close. My mother's brothers and sister were located in the middle part of Nebraska but I had no close relatives nearby.

BAINER: Did any of your high school teachers have any influence on you -- do you remember any outstanding high school teachers?

FAIRBANK: Not really clearly. I can't say that they had a great deal of influence on my courses at the University of Nebraska.

BAINER: You finished there in four years, is that right?

FAIRBANK: Yes.

BAINER: Your first job was where?

FAIRBANK: First job was with the Washington State College at Pullman, Washington.

BAINER: Who was running the Department there then?

FAIRBANK: Head of the Department of Agricultural Engineering.

BAINER: Ed Smith?

FAIRBANK: No, that was L.J. Fletcher.

BAINER: Oh, he was Head there then?

FAIRBANK: He was Head then, yes.

BAINER: That was before he came to Davis?

FAIRBANK: That's right -- before he came to Davis. In fact I worked for a while under the direction of Fletcher.

BAINER: Was E.J. Stirniman there at that time?

FAIRBANK: No. Fletcher left Pullman to come to Davis and then I was in charge of the Department and to help me we hired E.J. Stirniman who was a recent graduate from the Agricultural College at Ames, Iowa.

BAINER: How long were you in Pullman before you came to Davis?

FAIRBANK: In Pullman? I think it was about six years and then Fletcher came to Davis and later on he hired Stirniman to come to California under him and Fletcher finally resigned the University of California at Davis to become finally Vice President of the Caterpillar Tractor Company. Then Stirniman was made acting Head of the Department and he needed some help so both he and Fletcher knew me and I was invited to come to California to look over the situation and to be interviewed which resulted in my moving to California in 1923.

BAINER: I recall, I don't know whether I am right or not, that you, Stirniman and Charlie Barbee had some kind of business in Pullman.

FAIRBANK: Pullman, yes. We started the Pullman Engineering Company which was primarily a business in farm machinery (farm power and machinery) and we had dealerships for some of the common makes of machinery and tractors. We not only sold this equipment but also had the machine shop in connection with the business and did considerable manufacturing and repair of equipment.

BAINER: Was Charlie Barbee ever with the University at Pullman? Or was he with this shop that you had with Stirniman?

FAIRBANK: Charlie was with the University for a short time as a mechanic and then he, Stirniman and I joined in establishing the Pullman Engineering Company.

BAINER: So, it is rather interesting to realize that four important people that were involved in Ag Engineering at Davis all come from Pullman: Fletcher, Stirniman, Fairbank, and Charlie Barbee. When you went to Pullman, you were single, I take it, just out of college.

FAIRBANK: Yes.

BAINER: And later on you married?

FAIRBANK: Yes.

BAINER: And whom did you marry?

FAIRBANK: Married Ruth Renfro who was Postmistress on the campus of the State College of Washington.

BAINER: This was about when?

FAIRBANK: 1922.

BAINER: 1922. That was just before you came to Davis.

FAIRBANK: Yes, a short time before we came to Davis.

BAINER: Then you had two children?

FAIRBANK: Yes, we had two children.

BAINER: Were they both born in Davis?

FAIRBANK: No, only one. The boy, Bill, was born in Davis but before him was his sister, Elizabeth; we called her Betty. She was born at Pullman, Washington.

BAINER: Just for the matter of the record of the family, you have how many grandchildren?

FAIRBANK: We have four grandchildren.

BAINER: Four grandchildren. Let's take a little rest here. Well, now Jim, we may have overlooked some things that happened way back when you were a youngster and so let's revert back to your boyhood days to see whether or not you had any hobbies or any jobs or what your interests were. You mentioned that you rode a bicycle or a pony back and forth to school. Can you tell me more about these activities?

FAIRBANK: Well, this bicycle, even back in those days was pretty costly. My father gave me a calf to take care of. Of course, I took a lot of care of that calf and when it was about a year old, I sold it and used that money to buy a bicycle, a Raycycle, which was one of the top makes of bicycles in those days. I also raised a colt, and a racoon. The pony and dog were my constant companions back there on the farm.

BAINER: Did you work in a store or take part in any athletic events in school or anything extracurricular?

FAIRBANK: No, I was never very strong in sports and I didn't work to any extent other than on the family farm.

BAINER: Did you have to milk some cows?

FAIRBANK: Oh, yes. We milked cows and of course you know we had cats and the cats would come out when we were milking and one of the things to amuse yourself, and also the cat I guess, was squirting milk into his mouth.

BAINER: Were you in any school plays or any dramatics?

FAIRBANK: Yes, I took part in some of the school plays. I wouldn't say they were very dramatic but the plays of course were done by the youngsters in ages probably up to 18 or so.

BAINER: Okay. We will return to Davis and start out with your first activities in the Agricultural Extension Service. Was Crocheron Director of Extension Service?

FAIRBANK: Yes, Crocheron was Director of Extension.

BAINER: You were one of the first specialists to be housed with the subject matter department, weren't you?

FAIRBANK: I think that's right.

BAINER: In other words, up to that time, all the specialists lived in Berkeley.

FAIRBANK: Well, yes.

BAINER: I can't recall, when I came here, that they had anyone at Davis in Extension except you in Ag Engineering. Now of course it is quite common. What was your first project; what did you get started with?

FAIRBANK: Well, I think we started with tractor schools -- one week tractor schools. The county farm advisor would make arrangements with one of his farmers who had one or more tractors and arranged to set up these tractor schools. The neighboring farmers would come over and help overhaul his tractor or tractors. So we came in with a truck with a load of tools and equipment and parts. The work was done usually in a shed or something of that nature. We would start in with a tractor or tractors and clean them up and go over them to see what repairs they needed. Then start in and take them down, and put in the parts or equipment, whatever was necessary, and put the machine back together and try it out.

BAINER: This was in the day that the tractor was really just coming in as a power unit.

FAIRBANK: That's right.

BAINER: And, there were a lot of people who weren't familiar with repairing them.

FAIRBANK: No, they weren't, that's right -- it was a new thing for them.

BAINER: Another project that you had in those early days was farm sewage disposal.

FAIRBANK: Oh, yes. Farm sewage disposal that was by means of the septic tank.

BAINER: Can you tell me how a septic tank works?

FAIRBANK: Well, first, the household had to be plumbed of course with toilet facilities and sewer pipe and then the fluid from the toilet facilities was run into the septic tank. Through just biological action the solids were broken down, liquified and then run out by a pipe into an area or a disposal grounds where the water finally leached away into the soil.

BAINER: This is an underground system?

FAIRBANK: It's underground, that's right.

BAINER: Now, you put these demonstrations on at various locations?

FAIRBANK: Oh, yes.

BAINER: Actually built septic tanks on people's farms?

FAIRBANK: That's right. We would meet with the farm adviser who would locate a farm for the demonstration where they wanted to put in a septic tank system. The farmer would go ahead and dig the hole.

BAINER: According to the dimensions that you furnished to him?

FAIRBANK: According to the plans we furnished him, that's right, and then we would bring in the lumber necessary for the forms and then on the morning of the demonstration -- this is a public demonstration, you understand of course -- people came (the neighbors and the farmer) and we would cut up and assemble the forms, hang them in the hole he just dug, and then proceed to mix the concrete and pour the tank. A few days later we would return to this location to take the forms apart and remove them from the hole. Now these forms could then be used numerous times for other tanks and they were what we called "knock-down forms". Each demonstration was instrumental in getting other farm families interested in septic tanks.

BAINER: The people that came actually helped mix the concrete?

FAIRBANK: God bless them, they helped mix the concrete!

BAINER: What happened on a hot day?

FAIRBANK: Well, they all rested a little -- took a rest and maybe drank lemonade that the housewife of the home would bring out for them.

BAINER: Well, you and Herb Belton wrote a bulletin on the septic tank that has been revised several times?

FAIRBANK: Yes, the Farm Septic Tank bulletin had wide distribution over the state for years.

BAINER: Eventually the plans for these septic tanks were furnished by the state, is that right? -- Public Health?

FAIRBANK: No, they were published by the University of California.

BAINER: Yes, but the responsibility for distribution of the plans eventually fell to the State Department of Health.

FAIRBANK: Well, they were involved with it, that's right but the distribution was primarily through the farm advisers' offices in the state.

BAINER: I would say that was a very worthwhile project. I mean it really citified a lot of country homes.

FAIRBANK: Yes, we were quite well pleased with the results on what you might call a campaign.

BAINER: Then another early project had to do with lighting.

FAIRBANK: Oh, yes. Farm home lighting. As electricity was distributed through the country, there was an opportunity to use electric lights in the farm homes and in the out buildings and in the yard. We worked up a demonstration on electric lighting -- principles of lighting -- and we made an arrangement to represent a room. We had it arranged to put various kinds and sizes of electric lights in this room. They could light these up and see what combinations they liked best. Demonstrations were put on at farm centers all over the state. Lighting demonstrations were promoted by the home advisers in school houses or such buildings where the farm center had its meetings.

BAINER: So, you probably had more women in the audience than you had men?

FAIRBANK: Oh, yes. Naturally the women were more interested in it than the men.

BAINER: But you never did go into the appliances and things like that?

FAIRBANK: Yes, in some of the meetings. We had meetings arranged by the home adviser on the use and selection of various home appliances.

BAINER: Well, that leads us into some of the work that you did in spraying equipment.

FAIRBANK: Oh, yes. In connection with the people in the plant sciences, like the agronomists and the horticulturists, we worked on insect or pest control; mainly by means of various insecticides and also herbicides. This brought in of course cooperation with entomologists and the plant pathologists of the University; primarily those in the Agricultural Extension Service. Now, in order to apply these various pesticides or herbicides, we had to have spray machines or dusting equipment. We held a series of meetings on sprayers and dusters that the farm advisers arranged for. We emphasized the operation and maintenance of spray rigs including the pumps, of course, and the engines. Also included were air-blast type machines.

BAINER: Were these schools for spraying equipment similar to the tractor schools?

FAIRBANK: Yes, except they were short -- they didn't take the machine apart as a rule and those were just demonstrations of only a few hours, two to four hours.

BAINER: Well, you got into some problems on agitation in some of these oil mixes, didn't you?

FAIRBANK: Oh, yes! Yes, we found that the agitation of the mixes was insufficient to keep them thoroughly mixed. So, we did some experimental work with different kinds of blades or agitators in the tanks as well as the speeds of the blades. Oil and water don't mix very easy and so we had to work up equipment that gave enough agitation.

BAINER: We were talking about agitation of oil emulsions. You worked with different ones in the Department, but who was the one who really worked with you more than anyone else?

FAIRBANK: Well, that was Orval French. He was very much interested in the problem of getting a good job of spray application on the crops. In the earlier days much of our spraying solutions were made with Bordeaux or copper sulphate which mixed rather easily. Then they went over more to the use of oil emulsions -- those were much harder to mix. So, then the Department of Agricultural Engineering and also the entomologists spent some time in experimenting with the equipment to thoroughly agitate or mix these oil emulsions. Well, of course, the places you first think you'd work on are the blades on the agitator shaft down in the tank of the spray rig. By using some blades that would increase the mix alright, you just didn't have power enough in the engine to handle it properly and so then the problem was to get an adequate mix with the limited power you had on that spray engine. Orval did some excellent work in experimenting and developing a type of blade that would do the job with the power available.

BAINER: Another spraying problem about that time was acid spraying on mustard to control mustard in grain -- in barley?

FAIRBANK: Oh, yes.

BAINER: As I remember, you and Orval and Buss Ball over in Botany.

FAIRBANK: Oh, yes, Buss Ball.

BAINER: Can you tell us a little bit about that?

FAIRBANK: Well, one of the problems facing grain farmers in California was wild mustard and sometimes, often, in the Spring, a field of wheat would be practically yellow.

BAINER: With the blossoms from the mustard?

FAIRBANK: Yes, the blossoms from the mustard. Well, that of course, held back the production and also caused a problem in cleaning the grain later -- clean the mustard seed out of the seed wheat for example. It was found that the spiral- type separator worked for taking the round mustard seed out of the elongated wheat or barley seed.

BAINER: We will get back to this sulfuric acid spray -- the problem there, of course, was to mix the acid with the water -- it was a dilute mixture of water and acid and how was this done? Do you remember how it was done?

FAIRBANK: Oh, yes. Well, sulfuric acid is a pretty volatile chemical and so we didn't want to run the sulfuric acid, even in dilute form, through the spray pump. Orval worked out an idea of bypassing the pump by installing a little device called a Venturi which you'd pump the water through. It caused a vacuum or suction which could draw the sulfuric acid from the barrel and thoroughly mix it on its way out of the nozzles; so the only equipment that had to withstand the acid was the piping and the spray nozzles.

BAINER: You actually controlled the amount of acid by orifice plates in the line to the Venturi?

FAIRBANK: That's right.

BAINER: Now, this spray was just a once-over deal. I mean the actual application of the spray to the mustard, which is a broad-leaf plant?

FAIRBANK: Broad-leaf plant, yes.

BAINER: In one treatment, is that right?

FAIRBANK: One treatment, that is right and we had often times farm or field demonstration plots to try it out and to show how to control this mustard -- it was very startling when you'd drive along a field in which we'd sprayed some parts and left others unsprayed as a demonstration and you'd see these unsprayed parts completely yellow with the mustard blossoms and the sprayed ones green, because the mustard plants had been killed by the sulfuric acid treatment.

BAINER: Of course, this method was superseded eventually with another weed killer that became very, very popular: 2-4D -- remember that?

FAIRBANK: Yes.

BAINER: So that the acid sprays were only used for a few years until 2-4D came into the picture.

FAIRBANK: Which didn't have to be handled with the Venturi or something of that nature.

BAINER: But, you had to be very careful because of drifts, didn't you?

FAIRBANK: Oh yes, you had to look out for the material drifting over and attacking plants that could be harmed by it.

BAINER: What would be some of the plants that would be harmed by it?
FAIRBANK: Cotton? and grapes?

FAIRBANK: Yes.

BAINER: I think we should talk about these rural fire-fighting demonstrations and studies. You were involved in this thing for about five years in a big way, starting about 1928. Can you tell us about how the thing was organized and who you worked with and what you were trying to protect?

FAIRBANK: This was in cooperation with the late Woodbridge Metcalf, Extension Forester. This was over the period of 1927 through 1932. The fire losses in the state, well we might say rural fire losses of timber, brush, crops and rangelands, were getting so great that the insurance companies (fire insurance companies) threatened to discontinue insuring the crops and rangelands or drastically raise the insurance rates. So, the Governor of the State authorized the expenditure for studies to determine what we should do to reduce these losses.

BAINER: This evolved into what you called a Rural Fire-Fighting Equipment Committee? And then this Committee did stage an institute?

FAIRBANK: Yes, an institute and also collected statistics on the losses.

BAINER: This Rural Fire Equipment Committee was chaired by you, was that right?

FAIRBANK: Yes.

BAINER: And who else worked with you on that?

FAIRBANK: Woodbridge Metcalf, our Extension Forester, he is now deceased -- was very active in connection with it.

BAINER: Was Burnsides tied into this Committee?

FAIRBANK: Yes, Burnsides was.

BAINER: From the equipment angle?

FAIRBANK: That's right.

BAINER: The shop of the Division of Highways actually built some of these fire trucks for the Forest Service?

FAIRBANK: They built some of these trucks for the State Division of Forestry.

BAINER: What were they like? I mean were they a self-contained outfit?

FAIRBANK: Yes, they were completely self-contained -- they were tank trucks and had the usual fire equipment, tools and so on, but we didn't have to use many ladders with our grain fires.

BAINER: I recall the tanks held 400 gallons.

FAIRBANK: Yes, about 400 gallons and connected of course with regular centrifugal pumps and with the usual hoses, hand tools.

BAINER: There was some special hose, wasn't there, that was smaller than that used in the city? As I recall, there was some 1 inch and 1 1/2 inch cotton-jacketed hose.

FAIRBANK: Yes, it was smaller than the regular structure fires would require. Although these trucks were very useful in controlling or extinguishing fires in rural buildings in rural areas.

BAINER: Now this required refill stations.

FAIRBANK: Oh, yes. Yes, that was part of the plan to have sufficient water storage on many farms so that the trucks could refill their tanks in a hurry.

BAINER: As I also recall, we had a graduate student about that time by the name of Frost, Ken Frost?

FAIRBANK: Yes, Ken Frost.

BAINER: He was looking for some study that he wanted to make, special study, and you lined up a study in which he made some friction loss studies on these hoses, remember?

FAIRBANK: Well, I just barely remember.

BAINER: You see, there was nothing in the literature that indicated what the friction loss was in these hoses and Ken Frost made this study. The results were published in Agricultural Engineering about 1931 or '32 and then I think the Fire Underwriters also published it. So, it became an interesting little study as to what the friction losses were. Well now, after you drew up these specifications, it

BAINER: was a matter of checking up on these people, wasn't it? You made actual studies of the equipment?

FAIRBANK: That's right. Tests were run on the equipment. The equipment was as a rule built by

BAINER: Local shops?

FAIRBANK: Well, not local shops, not necessarily local shops, sometimes they were, but there were various manufacturers of fire trucks in the state that built satisfactory equipment.

BAINER: They had to come up to your specifications.

FAIRBANK: Oh, yes. They were very good about that. Of course, we had something specific there that we could check up on.

BAINER: I recall when I first came to Davis in 1929 that Professor Walker thought one of the things that I should do was to see some of the state. I don't know whether you recall or not but you were going to make one of these trips through Northern California looking over some of the rural fire-fighting equipment and I went with you.

FAIRBANK: Yes, I recall.

BAINER: We started out, I think, in Napa and worked up the Valley. On that same trip we went over to Mendocino City and put on a septic tank demonstration -- I'll never forget that one. We went over the low gap road from Ukiah to Mendocino City and I'm telling you for a little old guy from Kansas plains that was some road.

FAIRBANK: Yes, some road is right.

BAINER: Well, Jim, on this fire-fighting deal it was very evident that further work had to be done. You recall the Legislature in 1931 passed a law that made it necessary to have efficient spark arresting equipment on motorized equipment operating under hazardous conditions and that led us to do some studies of how these fires were starting. You want to tell us about it?

FAIRBANK: Well, it was about 1931 that the fire situation in California became serious and the insurance companies who insured structures, rangelands, and crops, announced that their losses were so great that they'd either have to discontinue writing that kind of insurance or raise the rates drastically. Well then, as I recall it, the Governor of California, I don't remember his name, induced the Legislature to appropriate funds to make a study of the situation.

BAINER: What was the first thing they did -- did the Legislature pass some kind of a law?

FAIRBANK: The Legislature passed laws that (better change that, not to pass laws directly but made appropriations for a study of what caused the ignition of this dry material). For example, how to arrest carbon discharged in the exhaust. What temperatures of this material would be required under certain weather conditions to start fires and what was the nature of the carbon particles? Like, for example, the size of the material. So then we simulated the situation by building up a muffle furnace and using carbon particles from the exhaust equipment on engines. To get enough of this we ground up the carbon electrodes of dry cells and screened them to various sizes.

BAINER: This furnace, as I understand, had a tube that ran the full length and had a heating element around the tube and you put the carbon particles in that tube and when the temperature came up on them, they were shot out of the tube?

FAIRBANK: It was very simple because we used a 22-rifle with blank cartridges and fired this into this tube and blew the hot carbon particles out onto the ground or area around and then kept bringing up the temperature until we got an ignition, got a fire started. Of course, then sometimes we were pretty busy putting the fire out.

BAINER: Under what conditions would these fires start? I mean the weather conditions?

FAIRBANK: Well, just naturally dry weather.

BAINER: What do you mean by dry weather?

FAIRBANK: Low humidity, maybe 10%, or 15%.

BAINER: Do you recall that Lou Wallace did work for the railroads trying to determine whether or not the cinders from locomotives started fires?

FAIRBANK: No, I don't.

BAINER: No? He did. He wrote a book and in this book he proved that they couldn't start fires and we looked at the conditions under which the studies were made: were on days of high humidity and low temperatures and naturally didn't start fires so he picked his weather in order to prove his point! Well, in other words, there were different sizes of these carbons, is that right?

FAIRBANK: Oh, yes. We had different sizes.

BAINER: And the real fine stuff didn't start as many fires as the big stuff. We started fires in barley stubble and then went to rangelands — remember going to the forests?

FAIRBANK: Went to the forest, tried it on needles.

BAINER: Yes.

FAIRBANK: Pine needles.

BAINER: And worked there too, didn't it?

FAIRBANK: Yes, it worked there.

BAINER: It was kind of a risky business. I understand you shot some of this into punky wood.

FAIRBANK: And then we had the delayed ignition of material so you had to leave someone in the area with fire equipment til there was no chance of a fire starting up.

BAINER: What happened in this one case? Actually it was lucky you had somebody there.

FAIRBANK: That's right, left a ranger there on the job.

BAINER: And this punky wood broke out in flames.

FAIRBANK: Yes.

BAINER: Well, then, after you got the basic information as to what would start fires and what wouldn't start fires and under what conditions, then a test procedure was set up to test the available spark arrestors?

FAIRBANK: Yes.

BAINER: And there were several on the market as I recall at the time. Were any of them any good? Well, any way the tests of these spark arrestors were made at night, isn't that right?

FAIRBANK: Yes, so we could follow where the hot carbon particles were going, you could see them.

BAINER: Do you remember one of the arrestors that seemed to have some promise but didn't perform too well?

FAIRBANK: Oh yes, do you want its name? One of the arrestors which looked like a good design but it tested in our runs only about 65% efficient. When we tried that spark arrestor at night with the hot carbon

FAIRBANK: particles, we could see what was happening. Although the arrestor was so designed to throw the carbon particles out of the gas stream, it also allowed the particles to emerge from the discharge of the arrestor. Well, a relatively minor change of the design, improved the performance of this arrestor from about 65% up to over 90%.

BAINER: Well, that actually was one of the few arrestors that could be modified, is that right? It was called a Yuba.

FAIRBANK: Well, yes, it so happened that it was rather simple change.

BAINER: And the interesting thing as I remember on that, was that there was very little back pressure.

FAIRBANK: Yes, very little back pressure.

BAINER: There were other spark arrestors on the market at that time.

FAIRBANK: Well, we tested practically all of them and eliminated quite a number as being not good enough. Fred Funke of the California Forest Service designed and built a satisfactory arrestor.

BAINER: You know, we received some literature from the University of Melbourne, they've been working on it.

FAIRBANK: In Australia.

BAINER: They have this problem and they've utilized some of our information.

FAIRBANK: In our experimental and development work.

BAINER: Yes, and they're actually manufacturing a modified Yuba in Australia.
One of the problems, of course, when you had this fire fighting equipment in the mountains or in the foothills was replenishing the water supply.

FAIRBANK: In the tank.

BAINER: In the tank, yes, and you're using that tank not only for fighting fires direct but you also, as I recall, had people on the fire line with five gallon back pumps and you were replenishing the back pumps.

FAIRBANK: Refilling the back pumps.

BAINER: Alright now, when you ran out of water what did you do?

FAIRBANK: Well, you couldn't put out any fires if you didn't have water! So, sometimes it was a long distance from the fire to a water supply, although there might be a good supply of water in a stream nearby; but it was so far below the ability of the pump to suck up this water that it was of no use to us.

BAINER: Well, what would you say some of these distances might be? That a bridge would be over a stream, the stream might be how many feet below?

FAIRBANK: Oh, it might be 25 to 50 feet. This was beyond the suction limit of the pump. So, it was a matter of a rather simple development of equipment involving a Venturi device. This draws water into the system by running the water from the pump through a nozzle in the throat of the Venturi which causes a suction that pulls in water from the stream and mixes it with the water under pressure from the pump. This transfer of energy lifts water back to the truck -- it was a simple outfit but it makes all the difference in the world of the utility of a tank fire truck.

BAINER: Very important.

FAIRBANK: Yes.

BAINER: Save many miles and probably saved a lot of acres that might of otherwise

FAIRBANK: Burned up.

BAINER: The next subject we want to get into is flax. The flax was introduced into California by the U.S. Bureau of Plant Industry. It was a high-yielding crop; but there were certain problems involved and that was when you and Stan Winters got into the act. You remember some of that early work in the early 30's?

FAIRBANK: Yes, much of the development of flax in California was carried out at the Imperial Valley Experiment Station. They worked with a variety called "Punjab" which was the high-yielding variety of flax introduced from India; but we had trouble threshing it. One thing was to get release from the pods or bolls and the other was the danger of cracking the seed with the standard peg-tooth cylinders of combines.

BAINER: Other types of cylinders available were: rasp bar and angle bar. They didn't have that aggressive action that the spike-tooth had.

FAIRBANK: That's right. But, one of the troubles was getting the seed separated from the mass of straw.

BAINER: This straw was torn up in the spike-tooth cylinder then?

FAIRBANK: Torn up in the cylinder.

BAINER: Act more like yarn.

FAIRBANK: Well, yes, like yarn; but it was found that installation of rubber rollers ahead of the regular rasp bar cylinders helped greatly in getting the seed popped loose from the bolls or pods and left the straw intact which helped in separation of the seed. Now this rubber roll idea was found useful in several of the different crops -- not only flax but also various varieties of beans.

BAINER: Well, this work at Imperial Valley was done by Mr. Gore who was the station superintendent. What was the effect of solving this threshing problem on the spread of flax in this State? You have any idea?

FAIRBANK: Well, Mr. Gore was in charge of the development or improvement of the crop of flax and the variety that they settled on was Punjab, which yielded heavily as compared with other varieties of flax. This work at the Imperial Valley Experiment Station raised some question among the people in Washington involved with flax as to the validity of his figures when they showed yields of around 55 bushels to the acre.

BAINER: So Gore repeated his trials another year?

FAIRBANK: Oh, yes. He made sure that he was right on the yields.

BAINER: Well, then what happened in the State? I mean we started growing flax from one end almost to the other.

FAIRBANK: Well, first thing you knew they had as much as 100,000 acres of flax growing in California.

BAINER: Now it's receded to I don't know how many thousand acres. Production is confined pretty much to the Imperial Valley. But in the early years you did check machines clear up to Tehama County, I remember.

FAIRBANK: That's right, it is in the north end of the Sacramento Valley.

BAINER: Well, let's carry on just a little bit more with these rubber rolls. You no doubt recall the work that we did with Agronomy, Luther Jones who was responsible from their side on threshing of small seed legumes. There again was a problem of trying to maintain germination of this seed and the seed was being damaged in the actual threshing. You joined a team of Kepner, Bunnelle and me so that

- BAINER: one of us could give Jones a little help each time he was in the field. Now, those rolls used for flax appeared again, is that right?
- FAIRBANK: That's right, they worked out very well in improving the quality of our threshing and also in recovery of the seed from the straw.
- BAINER: Actually they acted as retarders?
- FAIRBANK: Yes, in a way. They smoothed out the bunches going through.
- BAINER: That's right -- it held them back actually.
Then, of course, the other thing that was part of the success of that project was to cut the cylinder speeds.
- FAIRBANK: Slow down the cylinders.
- BAINER: Twenty-five percent or so.
- FAIRBANK: Yes. To reduce the amount of cracking of the seed.
- BAINER: So that the other work that we observed in that study was some of these suction harvesters. You may remember the suction machines up in the Orland area for harvesting Ladino clover?
- FAIRBANK: Oh, yes. They helped to recover seed from the low-growing Ladino clover plants.
- BAINER: There was another unique use for these rolls. Actually the seed companies bought the rubber roll bean threshers because they were all producing seed beans. Can you tell us about this other interesting application?
- FAIRBANK: I think you are referring to the threshing of radish seed. During the war the demand for garden seeds increased markedly and a common vegetable grown by the average public was radish. One of the large seed companies had some difficulty in supplying their demand for radish seed. Because of their experience with the rubber rolls in threshing beans, they tried threshing radish seed with the harvester with rubber rolls and it worked; it worked excellently.
- BAINER: Another crop that came in, and I guess Mr. Gore was involved in this from the Agronomy side, was vetch. Why did we get into vetch, I mean, what's the background here?
- FAIRBANK: Well, it was a valuable crop for feeding cattle but the big trouble was getting the stuff mowed because it had long tendrils and would clog up on the cutter bar of the mowing machine. But, we found by some trials that we could put on lifter guards about every foot on the cutter bar with stub guards in between and that proved to be a

FAIRBANK: big labor saver. Before we made those changes, it was sometimes necessary for workmen to follow the mowing machine with a pitchfork and separate the cut swath from the standing material before we made another round in order to just get through the field.

BAINER: Why did we grow the vetch?

FAIRBANK: It replaced the alfalfa.

BAINER: Well, what happened to alfalfa?

FAIRBANK: Alfalfa wilt, that greatly reduced the yield; whereas vetch was a much higher yielding crop and could be substituted for alfalfa.

BAINER: Actually some of the yields on vetch were as much as five tons per acre, remember?

FAIRBANK: Oh, yes. Five tons in one cutting.

BAINER: That's about as much as you got from four cuttings of alfalfa. It was still quite a nuisance to harvest. Do you remember you were credited with telling the farm advisers when they asked you about harvesting the stuff, by saying "Go ahead and tell their farmers to plant vetch; by the time they are gonna cut it we'll be there with something they can use to cut it with". Do you remember that?

FAIRBANK: No.

BAINER: Well, I do. You enlisted all the help you could get around that Department of Ag Engineering.

FAIRBANK: And that was good help we got.

BAINER: Well, you remember when Peterson from El Solyo Ranch came up to Davis to ask about how you're going to cut the vetch.

FAIRBANK: No, remind me. Remind me what Peterson said.

BAINER: Well, he came into Davis from the El Solyo Ranch which is down in Stanislaus County. He wanted to know what we knew about cutting vetch and we showed him the equipment that we had rigged up and told him we didn't have a place to work. That we had cut all the vetch that was grown especially for our project. However, Agronomy had a field of vetch but they weren't going to let us cut it until after Agronomy Field Day which was a week or two away. He told us to load that equipment on a truck and bring it to El Solyo Ranch. He said "I've got 135 acres of vetch and we'll board and room the whole crew free of charge". We'll give you a team, this was in the horse-drawn mower days, this vetch work was done with horse-drawn

BAINER: mowers. And, we went to the El Solvo and we did learn a lot down there and he was able to harvest his crop. An, then we did some barn storming with that equipment. We held demonstrations out through the valley, remember any of those?

FAIRBANK: I remember that we were busy there with hauling that mowing machine around, loading and unloading it, and showing the people that came to the demonstration, that we could cut vetch satisfactorily.

BAINER: One of the things that you did, as I recall, not only put on a demonstration of how to cut the vetch but you helped the man rig up his mower, is that right?

FAIRBANK: Yes, you see that was merely changing the guards on the cutter bar by using those lifter guards about one every foot or so and the regular mower guards were removed and substituted with stub guards.

BAINER: Then, how about that outer divider?

FAIRBANK: Oh, yes, and then we developed the outer divider which helped to separate the cut swath. One of the problems in cutting vetch was to cut cleanly at the outer end of the cutter bar and to separate the cut swath from the standing uncut material. So, with considerable cut and try we developed an outer divider, sort of a goose-neck device, made from a rod primarily and a design that any blacksmith could duplicate rather easily and then we drew up a plan for this -- it was published and distributed.

BAINER: Well, of course, the ultimate solution of this overall problem of having a high-yielding legume hay was for the plant breeders to come up with a wilt-resistant alfalfa, which they did! And that was the end of the vetch but this was kind of a stop-gap project.

FAIRBANK: An interim thing, yes.

BAINER: I think one of the things we ought to talk about a little bit now is the bulk handling of grain. You had quite a hand in promoting bulk handling as an extension project. Why did we handle grain in sacks in California?

FAIRBANK: Well, that was because it was a simple way to do it and it fitted in with our combining of grain, primarily wheat and barley and it was simple to just sack the grain on the combine and haul it into warehouses and stack it. Now, in the middle West, of course, grain has been bulk handled as I understand it, from the first. And, some of the resistance to bulk handling of grain out here was the cost -- building storage and elevating equipment.

BAINER: Some of the early harvesting of grain took place in the Great Valley and that was in the late 1800s. Where'd that grain go?

FAIRBANK: Much of that grain went into export, over to Europe, and the ships weren't provided with equipment for handling bulk grain.

BAINER: So it was simpler to handle it in sacks; then of course it was a matter of income for the exporters. You see, they could buy the dry grain in sacks and take it down to the Bay Area and store it for some time under the moist air conditions in that area. The grain increased in weight just from the moisture picked up which didn't cost anything; and, that naturally increased the chance for some profit.

BAINER: That wouldn't have happened if that grain had been in bulk; would it pick up moisture?

FAIRBANK: No, that was not likely to have happened in bulk; it wouldn't have absorbed moisture so readily for one thing.

BAINER: Then, of course, they were a factor in holding back bulk handling, right?

FAIRBANK: That's the way I see it.

BAINER: They had a market for those sacks?

FAIRBANK: Oh, yes, Then they'd clean them and sell them again!

BAINER: One of the reasons for bulk handling was the costs and how do you evaluate those?

FAIRBANK: The costs of bulk handling of a commodity is constructing warehousing facilities and mechanical handling of various elevators.

BAINER: Of course, the cost of the sacks was a factor, wasn't it?

FAIRBANK: And the cost of the sacks was

BAINER: And the labor, the labor of handling?

FAIRBANK: It was a big item.

BAINER: One of the things I recall, Jim, you took motion pictures of some of these successful bulk handling operations in order to promote bulk handling and showed these at farm center meetings and the like. Can you tell a little about that?

FAIRBANK: I found that in extension work often times motion pictures tell the story and people can understand what you're talking about.

FAIRBANK: Now, in this bulk handling thing I remember in some of our motion pictures we featured a bulk handling layout down in San Luis Obispo county where the handling of the grain was mainly by gravity and that didn't cost very much, not for power anyhow.

BAINER: How did you do it?

FAIRBANK: Well, there was one place I remember in the hilly country. They built their tanks on a side hill and built roads above and below the tanks so they could haul the truckloads of grain on the high road and dump directly into the tanks. Then to remove the grain there was another road below the tanks and all they had to do was drive empty trucks down there, back in under the tanks, open the gate and let the grain pour out of the tanks into the trucks by gravity.

BAINER: Well, that was clever.

FAIRBANK: Yes, no hands!

BAINER: You even had an exhibit at State Fair as I recall.

FAIRBANK: Yes, that I think was one with E.J. Stirniman, our former Extension Agricultural Engineer.

BAINER: This exhibit was at the State Fair, as I recall.

FAIRBANK: This was the State Fair at Sacramento.

BAINER: That's right, State Fair in Sacramento. You had a little model dump truck and a little cup elevator and the grain would be elevated from the pit into the dump bed and when there was a certain amount of grain, weight reached a certain point, it automatically dumped and went back in the pit to be re-elevated just to show how this grain was handled.

FAIRBANK: The Department of Agricultural Engineering at Davis did the work in developing and building that demonstration equipment which was something of a job to make that equipment so it would run smoothly and show accurately what we had in mind.

BAINER: And run for a week.

FAIRBANK: And run for a week unattended, yes!

BAINER: Well, that brings us to another phase of this grain handling and that was a pick-up sack loader. Remember during the war we didn't have as many able hands to handle these sacks and you and Stan Winters built a loader -- do you want to mention that?

FAIRBANK: Stan Winters was a member of the Agricultural Engineering staff. He was a practical and clever mechanic. Stan picked up this job of developing a mechanical sack loader which could be clamped to the side of a truck, platform truck, and haul it right out into the field and along the row and pick up the sacks as they came along and elevate them up to the man who was loading the truck. So, it was easy to load sacks about as fast as the truck could run over the stubble field.

BAINER: While we're on this automatic loader, there was another probably more important project in picking up bales of hay.

FAIRBANK: That's right.

BAINER: And you and Stan Winters worked on that.

FAIRBANK: Yes, we worked on that and we went ahead and made drawings and took photographs and worked up a little publication that showed how this equipment could be made.

BAINER: Well, you actually made a model of it.

FAIRBANK: Yes, oh sure, we made a working model.

BAINER: What'd you use for a chassis?

FAIRBANK: Oh, we took the hind end of a Ford Model A car for the chassis and then we had a number of demonstration meetings over the State where we would haul this rig into a field and hook it onto the farmer's truck. Then he and his crew would go ahead and load bales of hay right there in the field.

BAINER: Well, that bale loader, I mean, the power to run the elevating part of it came from the ground wheels.

FAIRBANK: Yes, from the ground wheels on the rear axle.

BAINER: And was adjustable for height so you could put several layers of bales on a truck.

FAIRBANK: That's right and that's where you wanted the bales.

BAINER: And when you had these demonstrations, as you say, you actually demonstrated picking up bales and in many cases the farmer had his shop man or a local shop man come and see it so he could build one.

FAIRBANK: Sometimes the local shop man would go out and see the demonstration and come back with the Circular and build one or more of them.

BAINER: Of course, this became quite common after this simple demonstration. Another very important development as a part of the war effort, when labor was so scarce, was to try to mechanize some of the tree harvest. You and Al Rizzi, as I remember, started working with prunes.

FAIRBANK: Oh, yes. Al Rizzi was Extension Pomologist and working with the different tree crops and this matter of harvesting fruit, for drying, was one that took a lot of labor -- labor that we didn't have. So we took one of the Agricultural Engineering's old International tractors, I think it was a Model 20, and set it to work shaking prune trees. What we did was put on a sort of crank device that was driven by the belt drive on a tractor to run this crank. It was so arranged that a cable attached to the crank would just shake a branch of the tree to which the cable was attached with a simple type of hook device. Underneath the tree you'd have either trays or a canvass spread under there so that after the shaking was done the canvass could be emptied into the field boxes or onto trays.

BAINER: And you also worked on English walnuts with the same device.

FAIRBANK: Yes, we worked on walnuts with the same sort of device.

BAINER: One of the problems after you hooked onto the tree with one end of the cable you had to back up to tighten it and you had to be pretty careful, didn't you?

FAIRBANK: Well, of course it would be possible to just break off a limb and it happened sometimes.

BAINER: And because of lack of stiffness of this cable you eventually went to booms that had rigidity in both directions.

FAIRBANK: Yes, a long boom that we could put a hook on the outer end for attaching to the trees.

BAINER: Actually the driver of the tractor could attach the boom to the tree, couldn't he?

FAIRBANK: Yes, he could from the driver's seat.

BAINER: Let's talk a little bit about orchard heaters. Along about 1940 when we had a lot of new faces in California that had purchased land and built homes and all of a sudden there was smoke from heaters used for frost protection.

FAIRBANK: In the citrus area.

BAINER: In the citrus area, yes. When they had these freezes, and what happened?

FAIRBANK: Well, of course what happened was that during a freeze a large percentage of the citrus growers had their orchard heaters going. The whole area was under a black haze from the smoke produced by these heaters. The public was upset. They demanded that something be done about it; so an appropriation was made by the Legislature to make a study of orchard heating by the University of California Agricultural Experiment Station. Several of the staff members of the Department of Agricultural Engineering worked on orchard heating and how to reduce the smoke. One problem, of course, was the maintenance of the heaters, of keeping the stacks brushed out to allow cleaner burning of the orchard heater oil. The other was the development of improved heaters by Leonard.

BAINER: Art Leonard?

FAIRBANK: Yes, Arthur Leonard, who developed the return stack orchard heater which performed much cleaner than the original types of heaters.

BAINER: Eventually with the passage of county legislation that set up the conditions that had to be met and then enforcing these regulations, this return stack heater that you mention was the only one that could meet the regulations.

FAIRBANK: That's right.

BAINER: Except some, I guess, some of the coke heaters and some of the pipe line heaters could but they were too expensive.

FAIRBANK: That's right, too expensive; so the return stack gas heater was a practical solution to the problem.

BAINER: It took quite a number of years, as I recall, before that came.

FAIRBANK: And then after it was well proven, we put on a long series of orchard heating demonstrations through the citrus areas.

BAINER: How did you evaluate these heaters?

FAIRBANK: Oh, yes. Well, that worked out relatively simple. We attached a hood device on the rear end of our Agricultural Extension work truck and by means of a blower, driven by the truck engine, we could put this hood over a burning orchard heater and draw a fraction of the gas through this system and through a piece of white cloth.

BAINER: Felt?

FAIRBANK: Yes, a piece of white felt for a certain length of time and then

FAIRBANK: remove it from the holder and measure the amount of light that would be reflected from that surface and in that way we could rate the performance of the heater.

BAINER: Jim, after the war you left the Agricultural Extension Service and joined the Department of Agricultural Engineering. The first assignment that I recall was the teaching of vocational ag -- some of the shop skills in the teacher training program of vocational ag instructors, is that right?

FAIRBANK: According to my memory, yes.

BAINER: What was your reaction to it?

FAIRBANK: Well, I was not really very enthusiastic about the shop skills. The real reason was that, I myself, was not a really skilled workman with wood particularly. Incidentally, one of my students was Richard Rominger who is now Director of the State Department of Food and Agriculture.

BAINER: Well, as I recall it, you taught this program for at least a semester or two before we prevailed upon Dean Hutchinson to come forth with the money to hire a man that had been particularly trained and we brought in Mike O'Brien who just graduated from Iowa State.

Then, of course, the other important program that you became involved in was cotton, cotton mechanization and this gave you, I think, enough travel to keep you from having too itchy feet after having pounded the highways of this State for 25-30 years. How did we get into this cotton mechanization? What was the general feeling of the Administration toward cotton in this State?

FAIRBANK: Well, actually the Administration of the University of California did not hold cotton in high regard and considered it more of a poor man's crop. But, of course, that was a mistaken point of view because cotton became one of the highly successful crops for California.

BAINER: This is because of high yield and high quality?

FAIRBANK: High yield and high quality, that's right.

BAINER: Well, in order to get started it was necessary to have a field where you could work and also machinery to work with. Where did you get the machinery, I mean, there was only one manufactured cotton picker at the time.

FAIRBANK: Yes, that was International Harvester Company and their dealer in that area was Allied Equipment Company.

BAINER: In Fresno.

FAIRBANK: In Fresno and this company cooperated with the University excellently.

BAINER: Furnished a picker every year?

FAIRBANK: Oh, yes. They furnished the picker and kept the picker in repair.

BAINER: There was an application then made for some land at the Kearney Ranch down near Kerman, as I recall, to grow cotton. What was wrong there -- what did we run into there?

FAIRBANK: I don't remember.

BAINER: Weed -- the weeds, remember? The weeds we had to contend with.

FAIRBANK: Oh, yes. It was very, very weedy.

BAINER: After being rather unsuccessful in growing cotton at the Kearney farm we decided to talk to George Harrison of Shafter.

FAIRBANK: Yes, in charge of the Shafter Experiment Station for the USDA.

BAINER: Now George was a cotton breeder?

FAIRBANK: He was a cotton breeder.

BAINER: And a good cotton breeder?

FAIRBANK: Yes, and a good one.

BAINER: What was his reaction to us coming down there with our project?

FAIRBANK: He was really enthusiastic about it.

BAINER: He actually saw the handwriting on the wall.

FAIRBANK: I'm sure he did.

BAINER: That cotton harvesting would be mechanized.

FAIRBANK: Yes. So he wanted to cooperate.

BAINER: As a result when his varieties were ready for harvest he insisted on seeing the machine pick each one. What happened if a variety didn't appear to be pickable with a machine?

FAIRBANK: Well, if it wasn't adaptable he discontinued further research work in developing that variety.

BAINER: One of the problems was the position of the bolls on the plant.

FAIRBANK: Oh, yes. When the bolls were very low the machine of course had trouble harvesting them and also that cotton was graded low because of the dirt incorporated in it. So, one of the items that George Harrison worked on was raising the bolls higher on the plant.

BAINER: How was this accomplished?

FAIRBANK: Well, this was accomplished primarily by the thickness of the stand.

BAINER: In other words, the heavier the stand, what happened?

FAIRBANK: The heavier the stand, the higher the bolls were.

BAINER: Up to about what?

FAIRBANK: About six inches.

BAINER: About six inches and that made quite a difference in the cleanliness of the cotton.

FAIRBANK: And the recovery was better.

BAINER: And recovery, yes. In some of this work you talked about crowding the plant -- what would you say those populations ran, what range?

FAIRBANK: Well, a big range from a low of about 20 thousand plants per acre up to 90 thousand.

BAINER: Eighty to 90 thousand.

FAIRBANK: Eighty to 90 thousand, but the yield remained about the same.

BAINER: That would indicate then that you might be able to plant to a final stand.

FAIRBANK: Plant to stand and cut out that cost of hand labor or chopping as they called it.

BAINER: Well, one of the things that gave problems of planting to stand was the seed.

FAIRBANK: Yes, the seed, you see, was coated with fuzz and so they were difficult to separate in the planter and prevented getting a rather uniform stand. So, to get at that they treated the seed with sulfuric acid to remove that fuzz and then in that way they could control the rate of seeding rather accurately.

BAINER: One of the problems of cotton culture is the weeds that you have to contend with in the row. How were these handled?

FAIRBANK: It's hard to remove weeds in the row without removing the cotton plant. Weeds, of course, are one of the main difficulties of picking cotton by machine.

BAINER: And also robs the cotton plant of nutrients.

FAIRBANK: Oh, sure.

BAINER: It affects the yield.

FAIRBANK: Yes, the yield.

BAINER: How were weeds controlled?

FAIRBANK: Well, the problem was pretty much solved by use of plain cultivation and going through the field with a flaming device on the cultivating equipment. In some cases, we'd flame the rows as many as nine times.

BAINER: How big did the cotton have to be before you could flame?

FAIRBANK: Well, not very big, just about the size of a lead pencil.

BAINER: This didn't affect yield?

FAIRBANK: Not that we could see.

BAINER: Then, of course, you had to be careful about the cultivation of the land right next to the plant so there weren't any clods to deflect the flame.

FAIRBANK: That's right. Clods would deflect the flame into the plants and do damage.

BAINER: Well, early in your work I recall there were some 65 or 70 pickers going about the second or third year of this project. There was an economic study made by Hedges and Bailey -- Hedges was with the University and Bailey USDA -- and they compared the costs of harvesting by machine and by hand. Do you recall what these costs ran?

FAIRBANK: A cotton picker, back in the days we ran these tests, was selling for in the vicinity of \$16,000 a piece.

BAINER: That cost had to be amortized, is that right?

FAIRBANK: The cost had to be amortized, in other words, the machine had to be paid for out of his crop and so this study made by Hedges and Bailey triggered this amortization along with the loss in quality of cotton, if any loss, and the machine repairs and this amortization was about 20 percent.

BAINER: And the interest on the investment.

FAIRBANK: That's right.

BAINER: And don't forget field losses.

FAIRBANK: And some reduction by field losses of lint.

BAINER: Well, then what did it come to?

FAIRBANK: Well, it came to about \$45 a bale by hand; and only about \$25 a bale by machine.

BAINER: That's \$20 a bale difference.

FAIRBANK: That's a saving of \$20 a bale which could make a tremendous difference, of course, in the final outcome of growing cotton.

BAINER: Two bales of cotton to the acre would be \$40.

FAIRBANK: Forty dollars an acre.

BAINER: Plus the fact that the farmer didn't have to worry about blue Mondays. Remember those? Didn't have the crew all show up to pick cotton.

FAIRBANK: That's right. Yes, during picking days, Monday was called blue by the owners because they didn't always have a sober crew on the job Monday morning.

BAINER: Well, as a result of this economic study, what happened? I would say, at the time that that study was made, less than 10 percent of the cotton was picked by machine?

FAIRBANK: Within a few years about 90 percent of the cotton in California was picked by machine.

BAINER: So California was leading the nation.

FAIRBANK: And they were leading the nation in cotton production.

BAINER: Well, Jim, just in the matter of record, how long were you in the Extension Service?

FAIRBANK: Well, I started here in Agricultural Extension in 1923 and continued until 1946 when I transferred into the Department of Agricultural Engineering at the University of California, Davis.

BAINER: In 1950 what happened? That was four years later. Coke, as I recall, was made Director of the Agricultural Extension Service, Statewide.

FAIRBANK: Well, I returned to the Agricultural Extension Service as Associate Director with residence at Davis.

BAINER: When you came to Davis I don't think they had any other Extension Specialists here. If they did, there were very few. In the meantime a number of specialists began to join the subject matter departments and were housed at Davis. Pomologists, and animal husbandry people

FAIRBANK: Agronomists.

BAINER: Agronomists and entomologists and that meant that there was, oh, according to what I was able to dig up, there were some 65 Extension Specialists on the Davis campus and they needed somebody to keep them all in order and keep the organization going and that's when Coke prevailed upon you to return to Extension and be his Associate Director. Well, Jim, you were in Extension when you returned to Davis for a number of years. Can you tell me how long this period was?

FAIRBANK: Well, this was a period from 1950 to 1959.

BAINER: You retired then in 1959?

FAIRBANK: Retired in 1959.

BAINER: What were some of your duties in your new connection with Extension?

FAIRBANK: Well, it's in that group of supervisory duties: to help organize programs, to help the staff in their day to day activities, to help budget for different activities, to promote and replace staff members.

BAINER: Were you ever involved in these commodity days, these field days, that the various departments held in Davis?

FAIRBANK: Oh, yes.

BAINER: What were some of these?

FAIRBANK: There were these field days such as Tomato Days, Prune Days, Dairy Days, Beef Cattle, Swine Field Crops, Farm Machinery Conferences and so on.

BAINER: These were all pretty much handled by Extension, as I understand.

FAIRBANK: Yes. the whole State, that's right.

BAINER: Then you had one big activity in the late summer, 4-H -- that brought in a thousand or more students -- that must have been a big show.

FAIRBANK: Well, there we had help, of course, from many of the specialists and also some of the farm advisors.

BAINER: Yes, and even some of the subject matter divisions.

FAIRBANK: And subject matter, oh sure.

BAINER: I remember getting involved in one or two of those. This little project or act (if you want to call it that) a show called the birth of an idea. I remember giving that to the leaders in the Gold Star division. What was one of the big events as far as the 4-H was concerned?

FAIRBANK: Well, that was the annual 4-H Club encampment on the Davis campus. During the early years we put up tents for the 4-H club members and they came in by special train from various counties over the State.

BAINER: They brought their sleeping bags?

FAIRBANK: Yes, they each brought a sleeping bag for this encampment.

BAINER: This was before we had enough dormitory space on campus to take care of them.

FAIRBANK: That's right, before we had sufficient space for them. Then we had a 4-H club program including a special group called Diamond Stars. These were selected, maybe only one to three from different counties and they came in for a preview of the encampment and were given an insight into the activities of the different departments on the campus.

BAINER: This was a closer contact actually than the big crowd had.

FAIRBANK: Oh, yes, yes. They got more detailed information than when they brought in the large groups.

BAINER: Well, then this was the nucleus that became candidates for national honors?

FAIRBANK: Yes. For the annual conference of 4-H club members and leaders at Washington, D.C. The members were selected from among the Diamond Stars.

BAINER: That would be only one or two or three or four at the most from the whole State.

FAIRBANK: From the whole State, that's right.

BAINER: Now, of course, they don't have to use tents for these 4-H kids; they come in and are given a look at the housing facilities on campus and food service. They still come, don't they?

FAIRBANK: Yes, oh, yes. They still have these annual meetings. Annual encampments, they call them.

BAINER: How many kids would be involved in this thing?

FAIRBANK: Oh, 500 or 600.

BAINER: I thought it was more than that.

FAIRBANK: I don't know, maybe have to check that.

BAINER: Jim, I thought today we would diverge a little from our regular procedure and simply hit the highlights of your career in Agricultural Extension in a chronological order. We have actually put down some of the highlights by years but we'll start back in the first full year of your Extension activities in 1924. So, Jim, it's all yours, I may break in here and there and ask you a question or two.

FAIRBANK: I hope you do. Well, in 1924 I was just getting started in the Extension program here in California and I was under the guidance of E.J. Stirniman who was my predecessor as Extension Agricultural Engineer. One of our assignments was the silo construction demonstrations and also meetings on the design of barns. In 1925 we were engaged with various tractor schools to demonstrate the maintenance and repair of tractors and engines. According to my records we had three of these one-week tractor schools, 13 one-day tractor schools. We also conducted a program on septic tank construction for farm homes. In 1925 we had 16 of these demonstrations in nine counties. We also gave attention to farm home lighting. In '25 we had 78 demonstrations on the principles of lighting in 26 counties. In addition to those demonstrations we had 43 method demonstrations in 12 counties.

BAINER: That brought the total of demonstrations in electricity to how many?

FAIRBANK: One hundred twenty one.

BAINER: Boy!

FAIRBANK: In 1926 we were still on and connected with tractor schools. We had two one-week tractor schools and 20 one-day tractor schools.

BAINER: By this time you were on your own, weren't you? Stearnie had come into the Department.

FAIRBANK: Oh yes, Stirniman had come into the Department of Agricultural Engineering. Then we had during '26, 11 septic tank construction demonstrations, 60 on farm home lighting and 20 method demonstrations on lighting. In addition, we tried out one machinery meeting in Orange County. Now, in '27 we had six one-day tractor schools and 20 septic tank demonstrations and 49 farm home lighting meetings, 14 power sprayer meetings and also had one more field day and four household refrigeration meetings -- those were in Madera and Kings Counties. We worked on the development of rural fire protection equipment in testing nozzles that were suitable for fire protection when used with power spray machines. In 1928 we had 24 power sprayer meetings, seven lighting meetings. During the four years we gave 282 lighting demonstrations to an audience of 9900 people.

BAINER: Boy, that's carrying the message!

FAIRBANK: In the work on rural fire protection we made a survey of the fire equipment over the State and we did some testing and also building up equipment and I served on a committee which worked on the standardizing of apparatus for rural fire protection. That was in cooperation with the Board of Fire Underwriters of the Pacific. We had 34 fire protection demonstrations in 12 counties.

BAINER: You're in 1929 now?

FAIRBANK: Yes, '29. Twenty power sprayer meetings.

BAINER: Oh, here's something, Jim.

FAIRBANK: Oh, something more for

BAINER: '28

FAIRBANK: Oh, yes. Well, in 1928 the University of California made up a demonstration train which travelled over much of the State of California which was made up of seven, I think, passenger coaches equipped with demonstration equipment for the purpose of showing recommended practices for rural homes and for farming. A number of various department people and specialists accompanied this train and at the various scheduled stops they put on lectures using demonstration equipment.

And in 1928 the St. Francis Dam in southern California broke and caused a tremendous flood damage to farm equipment, structures, roads, over hundreds of square miles of property.

BAINER: Well, this was on the Santa Clara River, was that right?

FAIRBANK: On the Santa Clara River, that's right.

BAINER: Who actually assumed some of the responsibility here?

FAIRBANK: Well, the responsibility was assumed by the City of Los Angeles. The State government wanted a survey of the damage and so the city could be assessed for recompense. The University of California was asked to assume this job and they put a staff of approximately 30 people on making this survey. It was largely under the direction of the Agricultural Extension Service.

BAINER: There were actually orchards that were just practically covered up with sand, weren't they?

FAIRBANK: Oh, yes. There were orchards that were ruined because of the sand that was deposited.

BAINER: Well, that's quite interesting, that went on several weeks, I assume.

FAIRBANK: Oh, yes, yes. A large crew of farm advisors and specialists from the Agricultural Extension Service was assigned to making this survey and the result was that there were very few lawsuits for recompense which was an indication that the survey was reasonable.

BAINER: You made some studies of rural fire trucks.

FAIRBANK: Oh, yes. Now in '28 another occupation was the study and survey of rural fire trucks.

BAINER: How many were involved here?

FAIRBANK: Twenty five in this case.

BAINER: It didn't look like you were standing around holding your hands, Jim, in the year 1928.

FAIRBANK: Oh, no. We had things to do. Now in '29 we had 20 power sprayer meetings. We surveyed 17 more rural fire trucks and went ahead with further developments and tests of fire equipment.

BAINER: Well, that was the year you held a rural fire institute.

FAIRBANK: Yes, we had a rural fire institute for three days in Davis; and we made plans and specifications for four tank trucks for the Division of Forestry and built by the State Division of Highways.

BAINER: Burnside involved in that?

FAIRBANK: Oh, yes. I think Burnside was the man that was in charge of that part of the Division of Highways program in Sacramento. Then we had 109 fire demonstrations attended by over 12,000; and, oh yes, on the side we had three septic tank construction demonstrations. Now in 1930 we had 123 fire demonstrations with over 23,000 people in attendance. We cooperated with the fire insurance

BAINER: Underwriters?

FAIRBANK: That's right, in connection with the underwriters.

BAINER: Adjustment of insurance?

FAIRBANK: Yes, adjusted insurance rates. Now the underwriters would insure rural structures only in areas or districts that were approved and that meant having programs and also suitable equipment for the purpose. The fire underwriters approved reductions in their fire insurance premiums on structures in rural areas where the districts were properly organized and properly equipped with fire protection apparatus.

BAINER: Then you got into some tillage work, didn't you?

FAIRBANK: Yes.

BAINER: What was the purpose of this -- what were you trying to do?

FAIRBANK: Well, you see, the Department of Agricultural Engineering had been making studies and tests on these heavy cover crop discs.

BAINER: This is the offset type.

FAIRBANK: Yes, the offset type.

BAINER: Was that McKibbon that did that work?

FAIRBANK: Yes.

BAINER: Eugene, (Gene) McKibbon.

FAIRBANK: Yes, Gene McKibbon took the lead in that test work at the University of California at Davis. We devised gages to be clamped on the axles of the heavy discs which would control the depth.

BAINER: And that resulted in less movement of soil sideways.

FAIRBANK: Okay. Well, we worked out test methods -- let's see we have said something

FAIRBANK: Less movement of soil and, of course, considerably less power required to pull them, or you could pull a wider machine with the same tractor. Then in 1930 we had a series of 61 power sprayer meetings attended by over 2,000 people. Also in that year we were involved with a grain cracking survey.

BAINER: What county was this in?

FAIRBANK: Well, this was Imperial, as I recall.

BAINER: Oh, I thought it was San Luis Obispo. Wasn't that where you were working with Coke?

FAIRBANK: Oh, yes, that's right, that was. We did have a problem.

BAINER: Yes, I know you did.

FAIRBANK: Well, we made this grain cracking survey on a number of machines in San Luis Obispo county when J. Earl Coke was assistant farm advisor. We tested 16 different combines and determined that much of the cracking of grain was because of too high a speed of the cylinder. We presented the information at a number of grain growers' meetings in four counties that year.

BAINER: Now, that takes us up to 1931 then, is that right?

FAIRBANK: Yes, that's where we are now, 1931. Well, the big program that year was still rural fire protection. We had a rural fire institute at University of California at Los Angeles. We developed an equipment committee statewide and we put on 52 fire demonstrations. Then with the help or leadership of the Department of Agricultural Engineering, one of the major projects in 1931 was the Experiment Station Project 915, a study of internal combustion engine exhaust systems and the relation to field and forest fires. Individuals who carried on this work were: Roy Bainer, Orval French and Coby Lorenzen.

BAINER: Don't forget yourself -- you were the leader!

FAIRBANK: Oh, no, I was

BAINER: Yes you were!

FAIRBANK: The figurehead pretty much.

BAINER: No you were not -- you was the guy that got us all involved -- I won't give in on that one.

FAIRBANK: Okay. Well, we worked out test methods -- let's see we have said something

BAINER: Yes, we actually did -- we've covered this but it doesn't hurt to duplicate a little bit. Actually started a fire, didn't you, with hot carbon particles?

FAIRBANK: We started lots of fire, yes, and sometimes we were pushed pretty hard to get 'em put out.

BAINER: And, you also found out there weren't any suitable arrestors on the market -- you mentioned that before -- and you modified some and made 'em work.

FAIRBANK: Made 'em work, that's right. And, oh let's see, we had along with this work was the development of orchard heaters and heater meetings.

BAINER: This was with Brooks.

FAIRBANK: Yes. Now Professor Fred Brooks, Department of Agricultural Engineering, made a study of orchard heaters and finally developed a much improved heater.

BAINER: No, that was Art Leonard that actually developed the heater -- the return stack heater. Yes, we've mentioned him before so we don't need to worry about that.

FAIRBANK: Yes, at any rate, we had a series of 25 orchard heater meetings to demonstrate the adjustments of heaters and specifically with the goal of cutting down the smoke output which required certain maintenance of these heaters. Also the ability of the return stack orchard heater to burn at a reasonable rate without producing as much smoke as some of the other heaters.

BAINER: Now we're in '32.

FAIRBANK: Yes, year '32. Well, in '32 we helped develop the operation of the rural fire equipment committee in various counties of the State and we had 64 fire equipment demonstrations or fire prevention demonstrations in 17 counties with over 23,000 people in attendance. The total for the five years was about 400 demonstrations with an attendance of over 80,000 people. We had 14 orchard heater meetings with the extension specialist in citriculture, the late Warren Schoonover.

BAINER: Yes, well he isn't late, isn't he still alive?

FAIRBANK: I'm not sure.

BAINER: Oh, I saw him not too long ago.

FAIRBANK: Oh, you did?

BAINER: Yes.

FAIRBANK: Okay.

BAINER: He's bald as an egg.

FAIRBANK: Bald as an egg, okay, alright.

BAINER: Balder than you are!

FAIRBANK: Oh

BAINER: You know what he tells you when you say something about how well he looks and he says he doesn't have a grey hair in his head!

FAIRBANK: Yes, doesn't have a grey hair in his head, alright. Now, then we also made a study of the vetch harvesting machinery problems.

BAINER: This is that tangle crop?

FAIRBANK: Which is a tangled crop, that's right, and we gave our attention especially in Marin, Merced, Sonoma counties. Also in 1932 we continued the home lighting demonstrations, holding seven meetings that year.

BAINER: Now, that leads us into 1933 and that's when we really got into some of that spark arrestor work, wasn't it?

FAIRBANK: We've said something about that

BAINER: Yes, I know, but we didn't do it all in one year.

FAIRBANK: Okay, then

BAINER: This is when we had to actually do something about the arrestor because they weren't stopping the particles that could start fires and so that took quite a bit of time. Then, of course, you got into some other things like orchard heating?

FAIRBANK: Well, you want to go ahead

BAINER: Yes, yes, go ahead. You had some demonstrations that year. We just want to show how busy you've been.

FAIRBANK: Oh, yes. Well, okay. Well, we had a number of orchard heating meetings, 14 in fact, in which we demonstrated the methods of reducing the amount of smoke because of the public annoyance with black smoke in their homes in the citrus areas during the time of cold spells.

BAINER: This was before the return stack heater -- that didn't come til about 1940?

FAIRBANK: That's right, 1940 when Leonard developed the return stack heater.

BAINER: Well, other projects run over from year to year and one involved vetch harvesting.

FAIRBANK: Oh, and vetch harvesting.

BAINER: A matter of handling tangled crops.

FAIRBANK: Tangled crops, such as vetch.

BAINER: We'd better finish '33 here.

FAIRBANK: Alright! Then we initiated flax threshing tests.

BAINER: That was in Imperial county mainly?

FAIRBANK: That was mainly down in Imperial Valley. Then tillage control with heavy disc harrows and we put on eight depth control demonstrations that year. Then we got involved with tank mix spray oil.

BAINER: This is oil emulsions?

FAIRBANK: Oil emulsions, yes.

BAINER: And that's pretty hard to keep oil and water mixed, isn't it?

FAIRBANK: Yes, it's a little difficult to keep oil and water mixed as we found out. But we developed methods and equipment that did a reasonably good job of mixing oil and water for spray mixers. We had 26 of those tank mix demonstrations with A.D. Borden, then assistant entomologist in the citrus area. We also had a number of demonstrations on deciduous fruit washers.

BAINER: Now that brings us up to 1934 and that's when you can talk about your vetch harvesting.

FAIRBANK: Boy! Now in 1934, continuing with our vetch harvesting work, we published Agricultural Engineering Information Series No. 6 on attachments for mowers to cut vetch -- that was by Bainer, Cochran and Fairbank. One man said that this was the first time I've ever been able to cut vetch without three men to follow the mower and clean up the swath so we could get through with the mowing machine. Then, let's see, you want to say anything more about lima beans?

BAINER: Yes, I'll say something. You had some demonstrations in Orange county and Ventura, I know on this experimental lima bean thresher, wasn't it? -- rubber roll thresher?

FAIRBANK: Oh, the rubber roll, yes.

BAINER: You and Stan Winters took that to the field.

FAIRBANK: That's right. Well, one of the problems developed in the cracking of lima bean seed and one of the things that helped that was to cut down the cylinder speed of the combine or threshing machine and also replacing the metal cylinders with rubber-covered rollers.

BAINER: These rolls ran at different speeds so that they'd not only give a pressure to the pod but it would give a scrubbing action.

FAIRBANK: Scrubbing action, that's right.

BAINER: Yes. And you and Winters, I think, barnstormed with that little experimental model that Winters and I built.

FAIRBANK: That's right.

BAINER: I was teaching and had classes in the Fall and you and Winters went out and barnstormed certain parts of the State. I remember we had to take that machine from Orange county to Ventura county and we were pulling it by a truck. In order to move it, we had to go through Los Angeles. We got up at 4 o'clock in the morning and tried to beat the early traffic and took that threshing machine right down through Los Angeles and that was before the days of the freeways. You're still doing work on tillage that I see.

FAIRBANK: Oh, yes. We had an additional 14 demonstrations of depth control on disc harrows.

BAINER: Yes, that's still '34.

FAIRBANK: We had 17 spray machine demonstrations and meetings in citrus with our citrus specialist, Warren Schoonover. Then we had 12 oil spray demonstration meetings in the deciduous fruit areas.

BAINER: You also issued a bulletin on septic tanks in 1934.

FAIRBANK: Well, H.L. Belton and I wrote a bulletin entitled "A Septic Tank for Farm Homes".

BAINER: And that was a pretty popular bulletin.

FAIRBANK: It received a wide distribution.

BAINER: In fact, it has been revised a good many times.

FAIRBANK: Many times, that's right. Then another project which was developed was ethylene gas treating plants for walnuts.

BAINER: That's for bleaching, was it, mainly?

FAIRBANK: No, that was for help in removing the hulls.

BAINER: Oh, yes. Get the hull off of it.
We're still in '34. You had a busy year in '34.

FAIRBANK: Well, you see this farm housing survey was still active.

BAINER: Civil Works Administration

FAIRBANK: Civil Works Administration, yes.

BAINER: This was during Depression when they began getting concerned about some of the housing for itinerants as well as laborers on the farms. How many homes did you survey?

FAIRBANK: In 1934 we, in cooperation with the Civil Works Administration, about 14,000 homes were surveyed.

BAINER: In how many counties?

FAIRBANK: In six counties. And at that time one of the purposes of the Civil Works Administration was to find work for people. Well, this survey used about 100 people.

BAINER: Well, another important publication came out that year. You got to be quite an author in 1934.

FAIRBANK: Oh, the spark arrestor bulletin.

BAINER: Yes. You got out the circular on the spetic tank and you got out this one on the vetch and you got out this one on spark arrestors.

FAIRBANK: Oh, yes. Yes, in that same year 1934 Roy Bainer and I produced or prepared under rural fire prevention Bulletin No. 577 "Spark Arrestors for Motorized Equipment" which has had a good distribution. Now you want '35?

BAINER: Yes.

FAIRBANK: Nineteen thirty-five. Well, again we worked on threshers for Punjab flax. Field studies of combines were conducted in Imperial, San Joaquin and Sacramento Valleys.

- BAINER: These were machines now that had the rubber rolls in conjunction with the rasp bar cylinder?
- FAIRBANK: That's what we recommended and many of them were installed. Also we had 10 depth control tillage demonstrations that year. Also another operation was renovation of range and pasture land. We made trials and observations with farm advisors.
- BAINER: Well, it sounds to me like 1935 started out like a 3-ring circus. You finished up some old studies and started some new ones.
- FAIRBANK: Well, one of the newer developments was the renovation of range and pasture lands along with continuing oil spray demonstration meetings -- we had four of those. And then came the start of weed control, broadleaves, by field spraying. We had 10 demonstrations on the use of dilute sulfuric acid sprays.
- BAINER: Now, what were you controlling there, was that mustard and grain?
- FAIRBANK: Mustard, that was one of the common broadleaf plants. That's where we made some startling demonstrations by spraying strips through a field heavily infested with mustard and, of course, in bloom. In a few days there were strips of dark green grain and strips of yellow mustard through the field.
- BAINER: Another new project you got started on here was feed grinding?
- FAIRBANK: Another one was feed grinding and the preparation of literature on feed grinders and feed grinding.
- BAINER: Mixers come into that?
- FAIRBANK: And mixing, that's right. And this was with the cooperation of the livestock specialists. Then there was work on the multi-stage walnut dehydrator and a number of meetings on that program.
- BAINER: You actually built up a model, working model, of that, didn't you?
- FAIRBANK: Yes, the scale model was used for demonstrations. We showed how it was built and operated. Then we had 26 farm home lighting demonstrations through the year.
- BAINER: This was with the home advisors?
- FAIRBANK: That's in cooperation with the home advisors. Then we happened to use some of the information from the Civil Works Administration Farm Housing Survey. Now, let's see, that's 1936.
- BAINER: No, you're still in 1935.

FAIRBANK: In '36 we had 33 livestock feed processing demonstration meetings demonstrating feed grinders and mixers. Those were put on from Imperial county in the south to Modoc county in the northern end of the State. That was in connection with the specialists of Animal Husbandry and Dairy. Then we helped with five horse pulling contests at County Fairs. That was in cooperation with the Department of Animal Husbandry.

BAINER: This is the outfit that Wayne Dinsmoore invented to compare the pulling power of horses and mules?

FAIRBANK: No. I didn't remember that. I recall though that some place or other they compared an elephant with horses!

BAINER: Well, actually I saw this thing work at the State Fair in Sacramento when you guys had it over there.

FAIRBANK: Oh, yes.

BAINER: And as I remember, the little span of mules that pulled more than their weight.

FAIRBANK: Yes, I had forgotten about that. It wasn't necessarily all together a matter of weight, it was a matter of knowing how to pull and pull together.

BAINER: That's right.

FAIRBANK: I guess we're over to '37 now. One of the projects of 1937 was on molasses equipment and with that project we prepared Agricultural Engineering Information Series No. 11 "Handling Feed Molasses on the Farm".

BAINER: Well, Jim, we have now completed your activities with the University in a chronological manner; we took up your Extension activities by years for the first 25 or 30 and it certainly shows that you had a very busy life. And in 1959 in July you retired as Agriculturist Emeritus and this just led you into something else, as I understand, and by August of 1959 you took on a consulting job, what was it?

FAIRBANK: Well, that was with the Foreign Agricultural Service, United States Department of Agriculture of the technical leader for agricultural leaders groups. For example, from the Republic of Panama, I took a group through Arkansas, Texas, Mississippi and Tennessee.

BAINER: Did they visit farms, colleges or manufacturers?

FAIRBANK: Well, quite a variety. It was largely related to agriculture which involved visits to farms, to agricultural agencies such as some of

FAIRBANK: the implement dealers and also some of the agricultural storage and merchandizing organizations.

BAINER: Well, just as that came to an end in October, you started out with another group in November.

FAIRBANK: Well, that was a trip to Massey-Ferguson Company in Detroit as a consultant on a survey pertaining to the operation of their West Coast plant at Fowler, California. And then in 1960, April and May, I took a Foreign Agricultural Leadership group from Morocco, took them to Arizona and California and Georgia.

BAINER: And that was similar trip as the one made by the group from Panama?

FAIRBANK: Well, that same idea. Another deal was in May and June 1965 and there I was technical leader for a Japanese group on utilization of aircraft in agriculture and forestry -- took them through California, Kansas, Pennsylvania, Delaware, New York and finally Washington, D.C. Now later, several years later, 1961 and to date I was connected with the Exchange Division of the American-Scandinavian Foundations whose main office is in New York. I was consultant on a retainer basis for their agriculture trainee program in California.

BAINER: Before we go on with that, Jim, there was one other little part-time job you did in there between '65-66 which fit right in the middle of that exchange with the American-Scandinavian Foundation, what was that?

FAIRBANK: Well, that was in connection with the University of California, United States Department of Agriculture and the Rice Growers Research Foundation and that I developed and built a precision distributor for soaked rice seed and granular chemicals on flooded paddy rice test plots.

BAINER: I have a letter that I received from a Delores D. Paola Director of the Exchange for American-Scandinavian Foundation pertaining to the almost 10 years concerning work you did for them and I thought this letter was very nice, I mean it went into considerable detail and I notice in the letter they referred to you as 'Uncle Jim'. What can you tell us about some of that?

FAIRBANK: Well, that started, oh, something over 10 years ago as I recall.

BAINER: Jim, what's the purpose of this American-Scandinavian Foundation -- when was it set up?

FAIRBANK: Well, it was founded almost 70 years ago to foster an understanding and cooperation between the two areas of the world we represent; that is, the United States and the five countries in Scandinavia.

BAINER: Alright, what were these five countries?

FAIRBANK: Well, they were Norway, Sweden, Denmark, Iceland and Finland.

BAINER: Now, the objectives, I mean, what has been the objectives of the Foundation?

FAIRBANK: In fulfilling the objectives of the founders and subsequent boards of trustees. The American-Scandinavian Foundation has organized a number of exchange programs for the benefit of Americans and Scandinavians, both students and professionals. Thus, a program enabling young men and women from Scandinavia to perfect their skills here was inaugurated. It reached its peak of activity in the years immediately following the second World War. The objective of the program then, as now, was to provide mobility and experience for a group which might not otherwise have the advantage of studying our way of life. Participation in the program is open to all professions or fields since its inception. Agriculture has been an important part of the program. Assignments are arranged and programs are monitored through correspondence, telephone communications and occasional visits. To some degree this is sufficient but very often on the scene, a faction which is exceptionally important. This need was demonstrated particularly in the latter part of the '50's and early '60's when it was found that agricultural trainees, who began their training in the East and mid-West, were lured irresistibly to California, not only for the climate but for the attraction of higher income.

BAINER: Well, because of this desire to move around through the country there was a time when the Foundation thought, 'well, we just as well wipe this program out because we can't administer the thing from New York City with people all over the United States'. Well, before they curtailed the program, they talked with some of the agricultural people in California and came up with an alternative suggestion or recommendation that they hire you, a recently retired agricultural specialist residing in California. Well, this is where you came into the picture, Jim.

FAIRBANK: I came in to assist Headquarters in assigning and supervising the farm trainees in California. The trainees benefited from carefully selected assignments tailored to their interests and the program benefited from the order brought to a rather free-wheeling operation. I put a lot of time into driving around the State looking for appropriate training openings seeing how the trainees were getting on and in some cases arbitrating disputes. When work on that farm slacked off we had to make transfers quickly to more suitable places. I acted as a broker between the trainee and the trainer.

BAINER: Well, in this letter I got from the Foundation I felt that they were quite pleased with the work that you did for them over a period of almost 10 years. They felt you had actually touched the lives of many, and helped several hundred young Scandanavian men and women along the way and that you had taught some pretty green Easteners the value of common sense and integrity.

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